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ABSTRACT

This instructor's resource guide is designed to accompany the student modules in the occupational subject area of agriculture/agribusiness. The guide defines safety and health training needs in the various occupations; describes the modules and their use; and encourages instructors to consider the safety and health needs of all students. In Section I some common safety and health problems in the occupational area of agriculture/agribusiness are cited. Section II provides the instructor with a short narrative of the content of each related student module. The third section identifies the basic components (introduction, objectives, subject matter, activities, references) of the 50 student modules in this program and describes the function of each of the various parts. Followup activities and module format are also described, and presentation approaches are suggested. In Section IV, a brief summary of some of the considerations of special-needs students is given. The final section concerns student certification procedures. Appended is a list of the 50 module titles. (CT)

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SAFETY AND HEALTH FOR AGRICULTURE AND AGRIBUSINESS OPERATIONS

AN INSTRUCTOR RESOURCE GUIDE

Developed for
THE U. S. DEPARTMENT OF EDUCATION
OFFICE OF VOCATIONAL AND ADULT EDUCATION

Developed by
THE CENTER FOR OCCUPATIONAL RESEARCH AND DEVELOPMENT
(Formerly Technical Education Research Center – Southwest)
601 Lake Air Drive, Suite C
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CE 031 451

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October 1981

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PREFACE

In the 40 minutes required to read and study this Instructor Resource Guide, one worker somewhere in the United States will be fatally injured in an on-the-job accident. More than 160 workers will have suffered disabling injuries, and several million dollars will have been spent or lost as a result of these deaths and injuries. In addition, at least 344,000 cases of occupational disease are reported annually among the 75 million emloyees in the labor force.

Because a majority of job-related accidents involve workers within their first six months of employment, safety and health information should be provided during preemployment training. Unnecessary exposure to potential health hazards can be minimized if proper training is provided. Health and safety information, the development of a positive safety attitude, and safe working procedures should be part of the curriculum for every vocational or occupational student. This can be accomplished by providing a separate health and safety course or, more easily, by infusing the information into appropriate, existing classes.

A series of separate instructional modules have been developed to facilitate the process of including safety and health instruction in existing curricula. Modules in the series that are appropriate for occupations in Agriculture/Agribusiness have been identified in this Resource Guide, which is one of seven related to different occupational clusters. The modules are adaptable to secondary, postsecondary, and adult education programs, including industry-based training and retraining programs.

The purpose of this Instructor Resource Guide is to familiarize you, the instructor, with the instructional materials developed and to suggest a systematic method for their use. Health and safety needs for the Agriculture/Agribusiness cluster will be described in Section I, including a definition of the cluster. The modules recommended for inclusion will be described in Section II. Various ways to use the modules are found in Section III. The fourth section describes mechanisms helpful in identification of special safety and health considerations for handicapped students/workers. The final section provides information concerning certification of students who successfully complete a training program that includes these modules.

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INTRODUCTION

When someone is asked to perform a new job, some form of training or instruction normally is provided. The training may be as brief as a few seconds of verbal directions or as extensive as months of intensive academic and apprenticeship preparation. The number of workers who annually sustain job-related disabling injuries and illnesses indicates that safety and health information may not be adequately presented in many training programs.

Safety and health information often is acquired only as a by-product of job-related responsibilities. In many cases, observation of experienced co-workers may be the only mechanism provided for training. This uncontrolled type of learning frequently leads to development of improper or unsafe work practices by the new worker. If the new employee does not possess a basic understanding of safety and health aspects of the job and a positive safety attitude, the potential for an on-the-job accident is greatly increased.

The five major sources of accidents among Agriculture/Agribusiness workers are the following:

- Farm machinery.
- Motor vehicles.
- Animals.
- Hand tools.
- Power tools.

The order of each source in the above list is indicative of the frequency of occurrence; for instance, unsafe use and improper maintenance of farm machinery account for almost twice as many accidents as does the misuse of motor vehicles. Agriculture/agribusiness accident statistics should be reduced by awareness and understanding of safety on the part of workers in daily contact with the listed accident sources.

In response to the need for safety and health instruction, the U.S. Department of Education sponsored a project to develop 50 safety and health instructional modules. Each module addresses a separate topic and is self-

contained. The first ten modules in the series (SH-01 through SH-10) are referred to as "core" modules and contain basic safety and health information useful to almost every occupation in the Agriculture/Agribusiness cluster. From the remaining 40 specific modules, 26 have been recognized as having content that may be appropriate for Agriculture/Agribusiness students, depending on their vocational and occupational goals. A complete list of all 50 module titles is included in Appendix A. This "shopping list" of modules permits you to select the exact safety and health information your students need. The modular form of presentation allows you to infuse modules when and as they are appropriate in your instructional plan.

SECTION I

HEALTH AND SAFETY IN AGRICULTURE AND AGRIBUSINESS

A young farm worker was using a tractor equipped with a front-end loader to lift heavy materials during construction of an outbuilding. A cement counterweight was attached to the back of the tractor. The worker drove the tractor too near an incline, and the tractor overturned, throwing its driver from the vehicle and down the embankment. The stress created as the vehicle turned over caused the counterweight to break loose. The counterweight rolled down the embankment and crushed the driver. This true story demonstrates how ignorance of safety in the performance of a common task can result in disastrous consequences. For each incident that results in a statistic such as this, many "close calls" go unrecorded. HOW MANY CLOSE CALLS HAVE YOU EXPERIENCED?

Another young worker was given no safety instruction prior to being asked to repair a tire mounted on a rim with a split ring. As a result of an unsafe procedure employed by the worker, the spring metal retainer ring was uncontrollably released, decapitating him. His career ended forever, only two weeks after it was begun.

These are but two dramatic examples of many significant agriculture/agribusiness safety and health hazards that can cause injury and even fatalities. In 1980, more than 2000 such fatalities were recorded as a result of agriculture-related accidents.

An overwhelming majority of farm-related accidents result from the misuse or careless use of tractors and other farm implements. Farm tractors are powerful, efficient, and versatile; however, their misuse causes them to continue to be involved in the deaths of many workers each year. Many times the operator expects the tractor to do more than it was designed to do.

One common problem in the use of tractors is that they have a high center of gravity that makes them easy to upset if improperly loaded or maneuvered. Rollovers are a serious problem for farm tractor operators. An additional danger exists when the tractor is not equipped with rollover protection in the form of overhead guards. Very basic instruction might avert

major accidents such as the one described in the newspaper article shown below.

Tractor Overturns, Kills Dairyman W. O. (Bill) Lee

W. O. (Bill) Lee, 38, who operated a dairy at Shady Grove, was found dead beneath his tractor early Wednesday, Sept. 12.

Mr. Lee was found by his wife, who went to look for him after he failed to return to their home in Tyler Tuesday night. A Big Sandy Fire Department rescue unit and City Marshal Mike Morton responded to Mrs. Lee's call from a neighbor's house and the neighbor, Clovis McCullum, provided a winch truck to free the body.

Justice of the Peace Cyril Bennett pronounced him dead. The accident had apparently occurred late Tuesday. Croley Funeral Home picked up Mr. Lee's body and it was transferred to Edwards Funeral Home in Strawn where services were held.

From 1960 until 1968 Mr. Lee was a field inspector for Borden Milk Co. of Tyler. A native of Gordon, he attended Tarleton State College and was graduated from Texas A&M.

Surviving besides his wife are a son, Curtis Allen Lee; two daughters, Lisa Renee Lee and Christy, all of Tyler; his mother, Mrs. Dewey Lee of Gordon; a brother, Robert Lee of Gordon; four sisters, Mrs. Marjorie Swanner and Mrs. Melaine Stringer, both of Gordon; Mrs. Kay Stiffner of Waco and Mrs. Marsha Mathis of Oklahoma.

Other farm equipment - such as augers, mowers, discs, and combines - and shop equipment - such as welders and power tools - also can be hazardous. When equipment is used infrequently, two additional hazards are created. First, the infrequent use causes some individuals to consider training in the safe use of these items to be unimportant and unnecessary. Second, equipment that is used infrequently may not be maintained properly, and this may create hazards for those who use it. Regular inspection and maintenance of equipment can save time, effort, and lives.

Electrical power is used extensively in many Agriculture/Agribusiness occupations. While electrically-powered motors provide some safety advantages over internal combustion engines, other hazards are created. Water is

a good electrical conductor, creating potential problems for those workers using quantities of water around electric power supplies. Dairy workers, horticulture workers (especially those who use extensive irrigation), and those involved in conservation and recreation activities frequently are exposed to situations that involve electricity and water. Overloaded circuits and motors, frayed wires, and improperly connected ground wires are a few of the other electrical problems that can occur. A fundamental understanding of these electrical hazards and brief instructions in proper safety precautions for electrical systems could save many lives annually.

AGRICULTURE/AGRIBUSINESS PROGRAM AREAS

The Agriculture/Agribusiness cluster includes a diversified group of occupations. Generally included are agricultural production, products processing, agricultural mechanics, the provision of agricultural supplies, and manipulation of agricultural natural resources. Related occupations involve ornamental horticulture and forestry, and services related to these areas. Agricultural occupations may include one or any combination of these areas.

For the purpose of this Instructor Resource Guide, Agriculture/Agribusiness has been separated into eight instructional program areas. Each area will be described briefly, specific health and safety hazards listed, and some of the common employment groups and recommended modules identified. The modules are numerically sequenced, but numbers do not represent order of presentation. A summary of the recommended modules is included in Section II, and a complete list of the 50 module titles is found in Appendix A.

The first ten modules of the JSHIM series (SH-01 through SH-10) are core modules and contain some information useful to workers in all occupations of the Agriculture/Agribusiness cluster. Of the remaining 40 specific modules, those of which all or parts might apply are listed with each area.

Agricultural Production - Workers in this program area include those involved in general farming, farm foremen, and general farm hands. Some employment areas include the following:

- Livestock Producers - Dairy, poultry, swine, beef cattle, goat, and sheep raisers, as well as ranch hands, beekeepers, and horse trainers and breeders. Others include those classified as ranch foremen, artificial inseminators, feedlot foremen, catfish farmers, and sheep shearers, as well as buyers of all these products.
- Crop Producers - Growers who raise fiber, grains, fruits, berries, vegetables, nuts, tobacco, mushrooms, forage, peanuts, potatoes, sweet potatoes, and sugar beets, and the workers who tend these crops.
- Farm Management - Farm managers and tenant farmers.

Workers in this program area use, or are exposed to hazards from the use of, a wide variety of equipment, chemicals, and animals.

Consider the following specific modules for this area:

SH-12 Personal Protective Equipment
SH-14 Using Ropes, Chains and Slings Safely
SH-15 Agribusiness Safety
SH-17 Mechanized Off-Road Equipment Safety
SH-19 Safety with Hand and Portable Power Tools
SH-22 Ladder and Scaffolding Safety
SH-24 Machine and Woodworking Tool Safety
SH-25 Safety Features of Material and Personnel Movement Devices
SH-26 Safety for Compressed Gas and Air Equipment
SH-27 Safety in Elevators and Grain Handling Facilities
SH-28 Welding, Cutting and Brazing Safety
SH-29 Hazardous Materials Safety
SH-30 Safe Handling and Use of Flammable and Combustible Materials
SH-31 Overcurrent and Electrical Shock Protection
SH-32 Working Safely in Confined Spaces
SH-34 Safety Guards for Machinery
SH-36 Safety Features for Floor and Wall Openings and Stairways
SH-44 Exhaust, Dust Collection, and Ventilation Systems
SH-50 Agricultural Chemical and Pesticide Hazards

Agricultural Supplies and Services - Persons working in this area include county agricultural agents, biological and agricultural laboratory technicians and aides, artificial insemination workers, and harvest contractors. More specifically, employment in this program area extends to:

- Those handling agricultural chemicals, such as exterminators, blight-control foremen, weed inspectors, and orchard fumigators.
- Grain, feed and seed salespersons, grain processors, feed mixers, and grain elevator superintendents.
- Seed analysts.

- Others such as veterinarian technicians, horseshoers, parts attendants, and tree pruners.

Consider the following specific modules for this area:

SH-12 Personal Protective Equipment
SH-13 Industrial Sanitation and Personal Facilities
SH-15 Agribusiness Safety
SH-18 Safe Operation of Commercial Vehicles
SH-19 Safety with Hand and Portable Power Tools
SH-22 Ladder and Scaffolding Safety
SH-24 Machine and Woodworking Tool Safety
SH-25 Safety Features of Material and Personnel Movement Devices
SH-27 Safety in Elevators and Grain Handling Facilities
SH-28 Welding, Cutting and Brazing Safety
SH-29 Hazardous Materials Safety
SH-30 Safe Handling and Use of Flammable and Combustible Materials
SH-31 Overcurrent and Electrical Shock Protection
SH-32 Working Safely in Confined Spaces
SH-34 Safety Guards for Machinery
SH-35 Ionizing and Nonionizing Radiation Protection
SH-36 Safety Features for Floor and Wall Openings and Stairways
SH-44 Exhaust, Dust Collection, and Ventilation Systems
SH-50 Agricultural Chemical and Pesticide Hazards

Agricultural Mechanics - Workers in this category may be farm equipment operators, dairy equipment service technicians, tractor and farm equipment technicians, and those who select and use hand and power tools, including welders. Some of the other employment areas include:

- Persons involved in land management, including surveyors and soil analysts.
- Occupations involving water management, including irrigation technicians.
- Workers responsible for setting up farm implements, and farm tractor and equipment operators.

Consider the following specific modules for this area:

SH-12 Personal Protective Equipment
SH-14 Using Ropes, Chains and Slings Safely
SH-15 Agribusiness Safety
SH-17 Mechanized Off-Road Equipment Safety
SH-18 Safe Operation of Commercial Vehicles
SH-19 Safety With Hand and Portable Power Tools
SH-22 Ladder and Scaffolding Safety
SH-24 Machine and Woodworking Tool Safety
SH-25 Safety Features of Material and Personnel Movement Devices
SH-28 Welding, Cutting and Brazing Safety
SH-29 Hazardous Materials Safety

SH-30 Safe Handling and Use of Flammable and Combustible Materials
SH-31 Overcurrent and Electrical Shock Protection
SH-34 Safety Guards for Machinery
SH-50 Agricultural Chemical and Pesticide Hazards

Agricultural Construction and Maintenance - Employees in this program area are concerned with design, fabrication, and maintenance of farm equipment and structures. Other employment areas include:

- Wiring, maintenance, and safe operation of electrical equipment and circuits.
- Custom builders and designers.

Consider the following specific modules for this area:

SH-12 Personal Protective Equipment
SH-14 Using Ropes, Chains and Slings Safely
SH-15 Agribusiness Safety
SH-17 Mechanized Off-Road Equipment Safety
SH-19 Safety With Hand and Portable Power Tools
SH-22 Ladder and Scaffolding Safety
SH-24 Machine and Woodworking Tool Safety
SH-28 Welding, Cutting and Brazing Safety
SH-29 Hazardous Materials Safety
SH-30 Safe Handling and Use of Flammable and Combustible Materials
SH-31 Overcurrent and Electrical Shock Protection
SH-34 Safety Guards for Machinery
SH-36 Safety Features for Floor and Wall Openings and Stairways
SH-37 Safety of Concrete, Forms, and Shoring
SH-44 Exhaust, Dust Collection, and Ventilation Systems
SH-50 Agricultural Chemical and Pesticide Hazards

Agricultural Products - This category includes workers who manage, preprocess, and inspect food and nonfood products. In the food products area, the handlers, inspectors and buyers are associated with:

- Livestock.
- Fish.
- Meats.
- Poultry.
- Potatoes.
- Eggs.
- Grains.
- Vegetables.
- Fruits.
- Nuts.
- Dairy products.

The nonfood products include:

- Tobacco.
- Cotton.
- Wool.
- Nonfood uses of grains and oilseeds.

These workers handle quantities of raw and finished products both manually and mechanically. Skill levels are extremely varied, from no training required to those requiring special degrees and/or certification.

Consider the following specific modules for this area:

SH-12 Personal Protective Equipment
SH-13 Industrial Sanitation and Personal Facilities
SH-14 Using Ropes, Chains and Slings Safely
SH-15 Agribusiness Safety
SH-19 Safety with Hand and Portable Power Tools
SH-22 Ladder and Scaffolding Safety
SH-23 Warehousing Storage and Retrieval Safety
SH-24 Machine and Woodworking Tool Safety
SH-25 Safety Features of Material and Personnel Movement Devices
SH-27 Safety in Elevators and Grain Handling Facilities
SH-29 Hazardous Materials Safety
SH-30 Safe Handling and Use of Flammable and Combustible Materials
SH-31 Overcurrent and Electrical Shock Protection
SH-32 Working Safely in Confined Spaces
SH-34 Safety Guards for Machinery
SH-36 Safety Features for Floor and Wall Openings and Stairways
SH-44 Exhaust, Dust Collection, and Ventilation Systems
SH-50 Agricultural Chemical and Pesticide Hazards

Ornamental Horticulture - People employed in this program area include those concerned with culturing plants for beautification or aesthetic purposes. Among the common employment areas are those in:

- Aboriculture, such as groundsmen, climbers, tree surgeons and their helpers.
- Floriculture, which includes those involved in designing flower arrangements, floral shop managers, and sales and delivery personnel.
- Landscaping, including gardeners and grounds keepers.
- Nursery operations, including nursery workers and managers, burlap baggers, groundsmen, and salespersons.
- Maintenance workers for parks, pest control specialists, and irrigation specialists.
- Turf management, such as greenskeepers and superintendents.

Chemicals used in modern plant propagation practices create a distinct need for an awareness of hazards that can exist due to mishandling. Hand and portable power tools are used extensively by workers from this area.

Consider the following specific modules for this area:

SH-12 Personal Protective Equipment
SH-14 Using Ropes, Chains and Slings Safely
SH-15 Agribusiness Safety
SH-17 Mechanized Off-Road Equipment Safety
SH-19 Safety with Hand and Portable Power Tools
SH-22 Ladder and Scaffolding Safety
SH-24 Machine and Woodworking Tool Safety
SH-25 Safety Features of Material and Personnel Movement Devices
SH-29 Hazardous Materials Safety
SH-30 Safe Handling and Use of Flammable and Combustible Materials
SH-31 Overcurrent and Electrical Shock Protection
SH-34 Safety Guards for Machinery
SH-50 Agricultural Chemical and Pesticide Hazards

Agricultural Resources Conservation, Utilization, and Services - Workers in this program area help to manage and monitor the proper use of our renewable resources, including:

- Forests, such as fire wardens and firefighters, as well as forest aides.
- Recreation, such as park aides and rangers, campground managers, fish and game wardens, caretakers, and hunting and fishing guides.
- Soil, specifically soil conservation aides and technicians.
- Wildlife, including gamekeepers, predatory animal hunters, trappers, and game farmers.
- Water, such as water treatment plant operators and industrial waste inspectors.
- Air, such as air quality inspectors, including those studying air pollutants and their effects on plants and animals.
- Fish, which includes fish culturists and farmers, as well as alligator and frog farmers.
- Range, including those who apply practices of range management.

As indicated by the previous list, this is a very diverse program area, which implies equally diverse needs for safety and health instruction. Many employment areas would cause workers to use or be exposed to many

potentially hazardous chemicals. Hand and portable power tools would be used commonly by this group of workers.

Consider the following specific modules for this area:

SH-12 Personal Protective Equipment
SH-13 Industrial Sanitation and Personal Facilities
SH-14 Using Ropes, Chains and Slings Safely
SH-15 Agribusiness Safety
SH-22 Ladder and Scaffolding Safety
SH-24 Machine and Woodworking Tool Safety
SH-29 Hazardous Materials Safety
SH-30 Safe Handling and Use of Flammable and Combustible Materials
SH-31 Overcurrent and Electrical Shock Protection
SH-50 Agricultural Chemical and Pesticide Hazards

Forestry Production, Processing, Management, Marketing, and Services -

Workers in this program area are concerned with proper forest land usage and management. Specific occupational groups include:

- Logging, such as producers, buyers, contractors, inspectors, cruisers, and skid operators.
- Wood utilizers, such as those who nondestructively harvest forests.
- Special products, such as Christmas tree wholesalers, woods rider, woods boss, and district forest manager.
- Wood processors, including sawyers and sawmill workers.
- Forest protectors, such as fire rangers, and fire suppression workers.

Since much of the activity in this program area is concerned with tree removal and processing, all related hand and portable tool safety should be considered.

Consider the following specific modules for this area:

SH-12 Personal Protective Equipment
SH-13 Industrial Sanitation and Personal Facilities
SH-14 Using Ropes, Chains and Slings Safely
SH-15 Agribusiness Safety
SH-17 Mechanized Off-Road Equipment Safety
SH-19 Safety with Hand and Portable Power Tools
SH-22 Ladder and Scaffolding Safety
SH-24 Machine and Woodworking Tool Safety
SH-29 Hazardous Materials Safety
SH-30 Safe Handling and Use of Flammable and Combustible Materials
SH-34 Safety Guards for Machinery

SH-42 Safe Use of Powered Industrial Trucks
SH-50 Agricultural Chemical and Pesticide Hazards

Other Agricultural Occupations - Workers in various agriculture-related occupations include animal keepers or caretakers, dog-pound attendants, laboratory helpers, kennelmen, and grubbers.

Consider the following specific modules for this area:

SH-12 Personal Protective Equipment
SH-13 Industrial Sanitation and Personal Facilities
SH-15 Agribusiness Safety
SH-19 Safety with Hand and Portable Power Tools
SH-22 Ladder and Scaffolding Safety
SH-29 Hazardous Materials Safety
SH-30 Safe Handling and Use of Flammable and Combustible Materials
SH-35 Ionizing and Nonionizing Radiation
SH-36 Safety Features for Floor and Wall Openings and Stairways
SH-44 Exhaust, Dust Collection, and Ventilation Systems
SH-50 Agricultural Chemical and Pesticide Hazards

Increased mechanization and sophistication of processes and procedures have placed new demands on workers in the Agriculture/Agribusiness cluster and its related occupations. Safety hazards have increased with the use of more complex and more powerful equipment. Training procedures and activities also have become more sophisticated to provide the needed information and experience for those entering the competitive fields that are part of this cluster. Safety training must keep pace with the changing demands if these workers are to perform their duties effectively, efficiently, and safely.

Daily use of new and exotic chemicals presents additional health hazards that must be considered during any training program. Highly toxic pesticides are being used to increase production. Their proper use, handling, and storage are extremely important. Proper training prior to the handling of these materials could prevent serious illness or even death for these workers.

SECTION II

SAFETY AND HEALTH MODULES FOR AGRICULTURE AND AGRIBUSINESS

The great diversity of occupations in Agriculture/Agribusiness makes it impractical to establish one safety and health program appropriate for all. To be useful then, any instructional materials for this group of occupations must be flexible enough to allow specific programs to be designed to meet individual student needs. Instruction utilizing modules has that flexibility.

The Job Safety and Health Instructional Materials (JSHIM) are packaged in a modular format. By definition, a module is considered to be a component of a larger entity. An instructional module is one that contains a discrete amount of information directly related to a specified set of instructional objectives. As an instructional module, it is also a component of a more complete instructional system. A complete example module can be found in Appendix B.

CORE MODULES

Because the JSHIM modules were designed with the intent of their being useful to many occupations in a variety of occupational clusters, two separate groups of modules were created. One group consists of ten modules classified as "core" modules. Safety and health experts consider these topics to be fundamental to almost every occupational cluster. The ten modules are numbered SH-01 through SH-10 and include the following:

SH-01 MATERIALS HANDLING

Manual and mechanical methods for lifting, loading, and transporting materials are discussed, including the use of various aids such as ropes, chains, slings, conveyors, overhead cranes, dock plates, and hand and industrial trucks.

SH-02 THE ROLE OF OSHA IN SAFETY AND HEALTH

The Williams-Steiger Act is discussed, including rights and responsibilities of employees and employers under the Act. OSHA inspections

are described; record-keeping requirements explained; and company training programs discussed.

SH-03 FUNDAMENTALS OF ELECTRICAL SAFETY

Basic electrical terminology and principles are discussed so that common electrical hazards can be understood. Safety features of equipment and OSHA requirements designed to protect workers from electrical hazards are explained.

SH-04 FIRST RESPONSE TO MEDICAL EMERGENCIES

Medical emergencies occur daily and may happen to anyone at anytime. This module is deisgned to inform students of actions that should be taken to aid the victim of such an emergency unti professional medical personnel arrive. First aid procedures are outlined for seventeen common medical emergencies.

SH-05 FIRE PREVENTION AND EMERGENCY PROCEDURES

Fire and emergency procedures for fighting fires are discussed. Codes and regulations related to fire safety are explained. Fire detection and protection devices are also described.

SH-06 WALKING AND WORKING SURFACES

Many job-related accidents are caused by falls on or from such work areas as floors, stairways, exits, ladders, and scaffolds. Safety precautions and regulations governing these surfaces are described.

SH-07 SAFETY SIGNS, LABELS, TAGS, AND COLOR CODES

A uniform system of signs, labels, tags, and markings is used to warn against a wide range of hazards. Specifications, including size, color, and purpose, are given for signs that indicate danger, caution, exits, directions, biological hazards, traffic, and safety instructions.

SH-08 RECOGNIZING JOB HEALTH HAZARDS

Chemical, physical, and biological health hazards are discussed, including contamination, effects, and protective mechanisms.

SH-09 RECOGNIZING JOB SAFETY HAZARDS

Employer and employee responsibilities in the recognition and correction of job safety hazards are delineated. Common safety hazards pertaining to fire, machine guards, electrical equipment, apparel, tripping, housekeeping, and lifting are described.

SH-10 STRUCTURAL EGRESS AND EMERGENCY PROCEDURES

Egress requirements are given and discussed, including specifications for exits, illumination of exits, and provisions for fire, smoke, fumes, and panic. The importance of emergency plan procedures and their implementation is stressed.

SPECIFIC MODULES

The remaining 40 modules contain information useful to at least one but less than all of the seven occupational clusters. Twenty-six of the 40 specific modules have been selected as being useful for the Agriculture/Agribusiness cluster. The following descriptions provide some insight into their content:

SH-12 PERSONAL PROTECTIVE EQUIPMENT

The student is instructed in the selection, use, and care of personal protective clothing and equipment, including safety helmets, hearing protectors, face and eye protective equipment, respirators, safety belts, and protective clothing and footwear. OSHA requirements governing protective equipment are reviewed.

SH-13 INDUSTRIAL SANITATION AND PERSONAL FACILITIES

Industrial health and sanitation encompass the areas of water, sewage and garbage, personal facilities, food services, and heating and ventilation. Terminology relating to and regulations governing these areas are given.

SH-14 USING ROPES, CHAINS AND SLINGS SAFELY

This module discusses in detail the use, care, inspection, and maintenance of fiber ropes, wire ropes, chains and slings. OSHA regulations

and consensus standards relating to this equipment and its use are presented.

SH-15 AGRIBUSINESS SAFETY

Agribusiness is defined, and the rationale for agribusiness safety standards is given. Safety guidelines are presented for use on the farm and for machinery and equipment installed by the agricultural industry.

SH-17 MECHANIZED OFF-ROAD EQUIPMENT SAFETY

Use of off-road equipment can be hazardous if care is not taken to protect persons, property, and utilities in the area. Particular emphasis is given to vehicle operation and operator requirements, protective equipment, and haul road hazards. Techniques for using power shovels, cranes, motor graders, bulldozers, and scrapers are given.

SH-18 SAFE OPERATION OF COMMERCIAL VEHICLES

Causes of vehicle accidents and rationale for accident control introduce this module, which discusses commercial vehicle safety practices. Recommended safety devices and preventive maintenance for motorized trucks are covered, as well as procedures for loading and unloading trucks. One section deals with special precautions for trucking hazardous materials.

SH-19 SAFETY WITH HAND AND PORTABLE POWER TOOLS

Tool control for hand and portable power tools is discussed. The types of hand tools are presented, and their care is described. Hazards, handling procedures, and safety devices of various portable power tools are discussed.

SH-20 PRECAUTIONS FOR EXPLOSIVE MATERIALS

After introducing terminology, the regulations and safety precautions governing use, transportation, and storage of explosives are described.

SH-22 LADDER AND SCAFFOLDING SAFETY

Types of ladders and scaffolds are described, as are their use and maintenance. OSHAct requirements and specific safety rules are discussed in detail.

SH-23 WAREHOUSING, STORAGE AND RETRIEVAL SAFETY

Prevention of material storage and handling accidents and injuries is the main topic of this module, which presents proper techniques for manual handling, including the use of hand tools and storage of various types of materials. Regulations governing shipping and receiving areas also are discussed.

SH-24 MACHINE AND WOODWORKING TOOL SAFETY

Boring, turning, milling, planing, grinding, and woodworking machines are described, listing common causes of worker injury. Safety rules and protective devices and equipment as they relate to machines and woodworking equipment are presented.

SH-25 SAFETY FEATURES OF MATERIAL AND PERSONNEL MOVEMENT DEVICES

Topics discussed include safety features and practices for such devices as conveyors, lift trucks, motorized hand trucks, aerial bucket devices, elevators, escalators, moving walks, and man lifts.

SH-26 SAFETY FOR COMPRESSED GAS AND AIR EQUIPMENT

Compressed gas cylinders can be extremely dangerous if not handled carefully. This module discusses regulations and general safety considerations for handling, storing, and using these cylinders and related equipment such as manifolds, outlet headers, regulators, hoses, hose connections, and torches.

SH-27 SAFETY IN ELEVATORS AND GRAIN HANDLING FACILITIES

Dust at grain elevators presents three basic hazards: explosion, fire, and danger to health. This module examines how each of these might be prevented through safe operating procedures and good housekeeping.

SH-28 WELDING, CUTTING AND BRAZING SAFETY

Gas and electric welding are discussed, with emphasis on the specific safety precautions and regulations governing each.

SH-29 HAZARDOUS MATERIALS SAFETY

General characteristics of combustible, flammable, explosive, poisonous, and corrosive hazardous materials are discussed, with special em-

phasis on compressed gases, flammable and combustible liquids, combustible solids, explosives, radiation, and corrosives.

SH-30 SAFE HANDLING AND USE OF FLAMMABLE AND COMBUSTIBLE MATERIALS
Properties and classifications of flammable and combustible materials are presented, with safety measures to be taken in the storage, transportation, and use of these materials. Special emphasis is placed on liquefied petroleum gas.

SH-31 OVERCURRENT AND ELECTRICAL SHOCK PROTECTION
Basic electrical terminology and specific methods for grounding techniques to prevent electrical shock are reviewed. Overcurrent circuit interrupters and their use are discussed in detail.

SH-32 WORKING SAFELY IN CONFINED SPACES
The classification of confined spaces is discussed, with safety fundamentals for each type. Emphasis is placed on safety procedures for working in boilers and unfired pressure vessels.

SH-34 SAFETY GUARDS FOR MACHINERY
The importance of machine guards is explained. Guard types, specifications, and maintenance are detailed, and practices for employees working with guarded machinery are described.

SH-35 IONIZING AND NONIONIZING RADIATION PROTECTION
Radiation comes in many forms and can have a wide range of effects on personnel exposed to it. Specific health concerns are detailed, as well as regulations established for protection against each type of hazard.

SH-36 SAFETY FEATURES FOR FLOOR AND WALL OPENINGS AND STAIRWAYS
Protection is discussed on floor openings, wall openings, open-sided floors, platforms, runways, and stairways. Fabrication specifications are explained.

SH-37 SAFETY OF CONCRETE, FORMS, AND SHORING
Personal protection for personnel working with concrete is discussed. Other topics include reinforcing steel placement, bulk concrete handling, concrete placement, shoring, and tilt-up construction.

SH-42 SAFE USE OF POWERED INDUSTRIAL TRUCKS

Inspection and maintenance of various classifications of powered industrial trucks, guards, and safety devices are discussed. Operating procedures for OSHA certification of operators are explained.

SH-44 EXHAUST, DUST COLLECTION, AND VENTILATION SYSTEMS

Types of exhaust, dust collection, and ventilation systems are described, as well as their functions, use, and effectiveness.

SH-50 AGRICULTURAL CHEMICAL AND PESTICIDE HAZARDS

Agricultural chemicals and pesticides are defined. Hazards, first aid, and protection for eye contact, skin contact, inhalation, and ingestion of pesticides are discussed. Safe handling and storage of chemicals and pesticides are described.

While each module has been assigned a number in sequence, there is no implied priority of presentation. Each module is fundamentally self-contained, allowing most to be used without regard to any numerical sequence. There are no prerequisites for the modules.

SECTION III

MODULE DESIGN AND USE

Each of the 50 JSHIM modules contains the following components:

Introduction - A synopsis of what is presented and why.

Objectives - Measurable objectives that relate to the content of each module are presented, and the objective's page location in the subject matter is noted.

Subject Matter - For most modules, this consists of 20 to 25 pages of content, with all content related to one of the stated objectives.

Activities - Following each portion of subject matter related to an objective is a question for the student to answer as an indication of mastery of that objective.

References - Suggestions for supplementary information.

An example module complete with all components may be found in Appendix B.

The basic content of each part will vary with the different modules, but its purpose and function remain the same. It is recommended that each section be considered when using a given module.

Exact usage techniques may be as varied as the individual instructional approach. Some basic hints, however, may be helpful in identifying some of the various ways in which they can be used. Each module is basically self-contained and could be used in a self-study or self-paced format. However, the optimum method of use is for the modules to be presented by an instructor using the module as a student study guide. Prior to assigning the module, examine the objectives to determine that all content is appropriate for your students. If certain content or objectives are not relevant, advise your students that they will not be held responsible for those sections. In addition, you should provide appropriate activities that will allow your students to practice proper safety and health procedures. Some follow-up activities include:

- Round-table discussions with students or adult groups in the workplace.
- Requiring verbal or written reports related to a single objective or a recent accident from newspaper articles.

- Developing or adding to a job safety and health bulletin board.
- Performing an in-house health and safety hazard survey of the classroom or other facilities.
- Guest speakers from the community, including such people as: Accident victims or their relatives, or people responsible for safety, such as firemen, policemen, or safety engineers for government and private industry.
- Field trips to workplaces similar to those the student will encounter.
- Having local emergency rescue units demonstrate their procedures and discuss problems.
- Constructing simulations that allow students to model or role play circumstances in safety and health.
- Putting health and safety information articles and information in a local or school newspaper.
- Promoting student involvement in local and national safety organizations.

One of the most significant responsibilities of a vocational or occupational instructor is to foster a positive student attitude toward safety and health. The activities listed above should help to build this positive attitude. Your effectiveness in establishing this attitude can be measured by student comments and actions. If you observe safety being willingly practiced in day-to-day activity you can be reasonably assured that a proper attitude has been developed.

Emphasizing your commitment to safety and health by setting the proper example is critical. Properly practiced safety rules will not only reduce work accidents, they also will decrease the possibility of classroom accidents and subsequent instructor liability. Your actions and attitudes toward safety and health will be carefully observed and copied by many students. An example is a situation in which activities dictate that hard hats be worn by all present. If the instructor tells all the students to wear hard hats but chooses not to do the same, students are likely to feel that it is actually unimportant or perhaps childish to wear a hard hat. Similarly, if the attitude of the instructor is conveyed by "I know they are uncomfortable and look weird, but put them on anyway!" a less than positive attitude will prevail. Regardless of the method used to convey safety and health information or the conviction with which it is presented, if it is

not being practiced in the learning environment its credibility will be lost.

Use of accurate, pertinent, and easily understood educational materials is a second way to promote a proper safety attitude. The Job Safety and Health Instructional Materials modules can be used as a source for making transparencies of illustrations, tables, or charts that can be used as teaching aids. Other supplemental information or aids can be found in the Reference section of each module. Modules are organized in a format that permits maximum flexibility and makes them suitable for use by instructors in almost any occupational or vocational area.

Two fundamental methods of presentation can be practiced in safety and health instruction. One method is to organize a separate and distinct safety and health course for students in one vocational area. An advantage of this approach is uniformity of the content presented to each student. Specifically allocated time frames for safety and health instruction are available when using this technique.

A second approach is to insert the safety and health instruction into existing training programs on an as-needed basis. This would benefit instructional programs that have only limited time and/or facilities available for training activities. Additional advantages are realized by the ability to present the exact content desired when it is most relevant to the student's training cycle. For instance, the best time to present information about selecting proper personal protective equipment is immediately before the student needs the information. More specifically, if the student were about to perform a task that required wearing a respirator, the section concerned with respirators of Module SH-12, "Personal Protective Equipment," would be most appropriate.

Modules SH-01 through SH-10 are considered core modules, and they have been recommended for use by all Agriculture/Agribusiness instructors. Much of the content presented in those first ten modules is basic enough that you might wish to present them as a unit at the beginning of the course. This does not mean that each objective of the ten core modules must be presented; you may select those that are appropriate for your instructional sequence.

As a mechanism for determining the level of previously acquired safety and health knowledge and skills, formative pretests can be conducted. Student activities found in the modules can be used, or separate instruments or procedures devised.

As each module contains distinct subparts relative to each objective, you have the option to present only that part (or those parts) of the module useful to your students in that specific instructional setting. If, at another point in their training cycle, additional information is needed from that module, the additional content can be studied without loss of continuity. Student retention and interest will be enhanced when the principles have an obvious and direct relationship to activities being performed.

If a group presentation format is used, visuals found in the modules can be made into overhead transparencies for ease of discussion. Other sources of safety and health information and mediated materials for Agriculture/Agribusiness can be found in a special "State-of-the-Art Report" prepared for the JSHIM project.

SECTION IV

SPECIAL–NEEDS STUDENTS IN AGRICULTURE AND AGRIBUSINESS

The Civil Rights Act of 1964 and the Rehabilitation Act of 1973 placed responsibility on the employer to set goals and timetables - and to prepare guidelines for affirmative action - that include employing the handicapped. As a result of these legislated acts and a growing need for more labor trained in vocational areas, increasing numbers of students with special needs are entering vocational training programs. To satisfy these requirements and ensure that special-needs students have an equal opportunity to be "mainstreamed" into the labor force, certain attitudes and actions must occur.

Many classification schemes are used to categorize handicapped workers and individuals. Those students and workers with physical handicaps usually can be divided into three groups. The three groups include those with:

- Hearing impairments.
- Visual impairments.
- Orthopedic impairments.

Some special consideration should be recognized if you have one of these students in your training program.

A deaf or hearing-impaired student will have difficulty reacting to verbal cues such as warnings or directions. Emergency alarm systems should be equipped with easily visible, flashing lights. As an added precaution, it is advisable to assign someone to help the worker identify the existence of an emergency or pending danger. A machine or tool that may be about to malfunction, or even explode, often will begin to make unusual noises before the problem actually occurs. The "buddy system" would permit a fellow worker with normal hearing to identify the problem for the hearing-impaired worker. The buddy also could help to turn off the machine or tool and clear the area.

The visually-impaired or blind student may have no difficulty in hearing warnings, but may have difficulty in leaving an area if unknown obstacles are present. These workers normally adapt quickly to their surroundings and, provided that no furniture, machinery, or materials are blocking

the path, they can move to safety in an emergency. Warning labels on hazardous materials containers should have braille interpretations or should be identified for the student. Storage of hazardous materials in an appropriate cabinet may also prevent accidental use of an unknown chemical.

Orthopedically-impaired workers may require structural or mechanical modifications to the workplace, depending on the type of handicap. Those confined to wheelchairs may need ramps for moving from one level to another. Aisles should be clear, and wide enough to permit easy movement. If wall-mounted tools or switches are to be used, either they should be within easy reach, or adaptations should be made for their use. Other types of modifications may be necessary for other orthopedically-impaired workers. The boring of a hole in a piece of stock material with a drill press is frequently a two-handed job. If the worker has only one hand available, one of two alternatives can be employed. The first is to attach a foot-feed to the press to allow the worker to use a foot to lower the drill. The other alternative is to provide a stage clamp to secure the stock in position so that it is not necessary to hold it. The stage clamp allows the operator to use the hand-operated lowering mechanism.

Most students and workers with permanent handicaps have learned to compensate for their "apparent" handicaps. Many can accomplish amazing feats in spite of what we perceive as insurmountable odds. Development of a positive attitude concerning the ability of these students to function in the workforce is extremely important.

An attitude must be developed that includes caring, understanding, and the belief that handicapped workers are capable of achieving exactly what you believe they are capable of achieving. Some special consideration may be required, perhaps including increased time and practice, to master certain activities. In some vocational programs Individualized Educational Plans (IEPs) documenting specific training programs for individual students have been used to identify the exact need.*

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*Conaway, Charlotte. "Vocational Education Serves the Handicapped." Voc Ed, Vol. 56, No. 3, April 1981, pages 22-25.

Each state provides special resource people to assist vocational educators with designing programs and suggesting techniques for training the handicapped student. Other state and local agencies such as those involved in rehabilitation may provide local support. Some individual schools provide professionals and paraprofessionals who move around to assist handicapped students in vocational classes containing nonhandicapped students. These persons can act as tutors, translators, facilitators, or whatever is needed to help the handicapped student successfully complete the training program.

Two other considerations should be recognized by instructors and employers. Structural accommodation and nonhandicapped employee awareness programs are both key factors for a safe and successful employment program of the handicapped.

Structural accommodations should include only those modifications necessary to allow safe movement of the handicapped employee. One of the most obvious examples is the need for ramps for use by wheelchair-bound employees.

Employers should also be encouraged to develop awareness programs for their nonhandicapped employees. These programs should encourage fellow employees to understand that the handicapped worker is expected to perform the assigned duties without placing an additional burden on other employees.

All eight of the previously identified program areas in Agriculture and Agribusiness contain occupations that could be filled by handicapped employees. Even more dominant is the role played in this cluster by migrant workers. Many of these workers have special needs, often including the need for assistance in understanding the English language. Inability to read basic warning labels and signs poses added dangers for these workers. Instructors and employers should develop programs to eliminate this problem. The use of international symbolism in signs is a fundamental help in that attempt.

If these suggestions are considered, handicapped or special-needs workers can successfully complete a safe and meaningful vocational program. And they can become productive and safe members of the labor force.

SECTION V
SAFETY AND HEALTH CERTIFICATION FOR STUDENTS

Traditionally, when a person satisfactorily completes a course of instruction, some recognition is granted. Often the recognition is in the form of a certificate issued by the institution or organization responsible for the instruction. This certificate becomes an official symbol displayed with pride by the recipient. A Safety and Health Certificate is particularly important to the new employee and the employer if it implies that the employee has demonstrated an understanding of the basic safety and health aspects relevant to the particular job.

Most employers are aware that documented safety and health training received by their employees is beneficial to them in the event of an OSHA inspection, and they will appreciate the fact that the employee holds a certificate and your institution maintains records to verify that training. Employers also will feel more confident about the safety of their workplaces when they hire people who already possess positive safety and health attitudes.

Three factors normally determine the credibility of the certificate:

- Reputation of the issuing institution.
- Instructor.
- Content of materials used during the course of study.

For safety and health instruction, a fourth factor must be considered; namely, the relationship of the content to federal safety and health regulations. All 50 JSHIM modules were designed to enable the student to recognize safety and health hazards and to understand the fundamental aspects of compliance with federal health and safety requirements. While the Occupational Safety and Health Administration (OSHA) does not certify training programs, OSHA representatives have been active on the nationally-based advisory committee formed to guide this project, and they have reviewed each of the 50 modules and have made constructive suggestions that have been incorporated.

The Center for Occupational Research and Development has attempted to structure the content of the materials to be accurate and relevant to current safety practices and regulations. The institution and the instructor who provide the training must be responsible for certifying that the information was accurately presented and that the student achieved the desired level of competency (80% mastery of objectives).

When an institution purchases modules from CORD, the same number of certificates as sets of modules will be sent to the institution. These certificates will require the signatures of two people; the faculty member who presents the instruction and the administrator of the institution. The certificate will state that the student has satisfactorily completed a particular number of hours of instruction in safety and health and will be presented to each student who successfully completes the training. A facsimile of the certificate is shown in Figure 1.

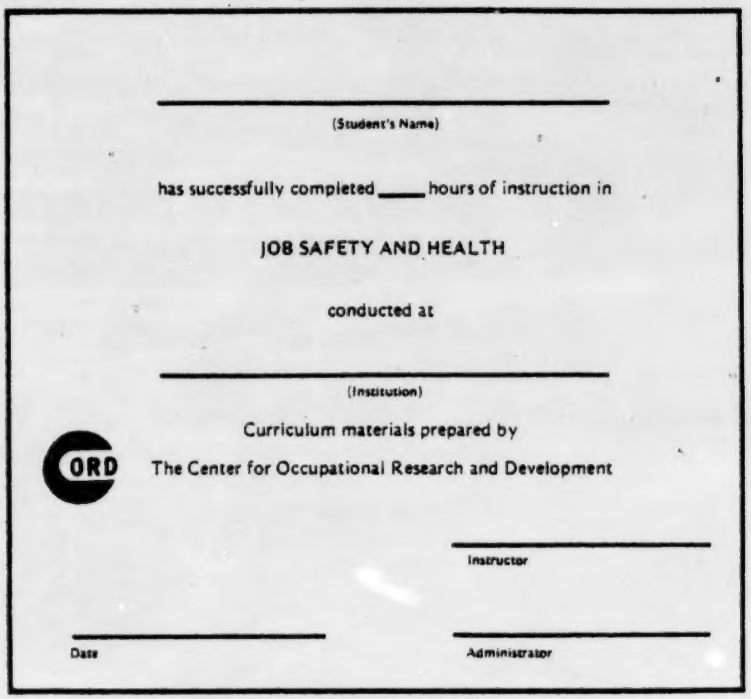
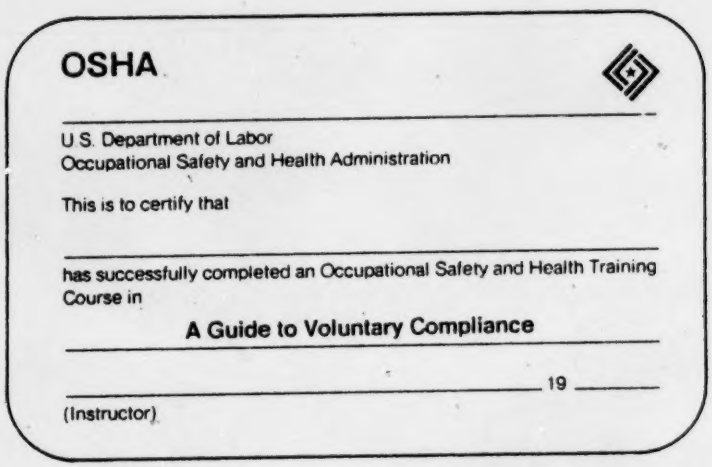


Figure 1. Facsimile of safety and health training certificate.

Your institution may wish to be able to present official wallet-sized OSHA certificates to students who complete your training course. This is possible if the instructor has received training from the Occupational Safety and Health Training Institute located at 1555 Times Drive, Des Plaines, IL 60018. The OSHA Training Institute serves mainly to train compliance officers, but the following three courses are available to the general public free of charge.

- A Guide to Voluntary Compliance (for instructors).
- Basic Instructor Course in Occupational Safety and Health Standards for the Construction Industry.
- Intermediate Guide to Voluntary Compliance in the Health Area.

These courses are offered several times annually. The certificate available for your students is shown in Figure 2.


OSHA

U.S. Department of Labor
Occupational Safety and Health Administration

This is to certify that

_____

has successfully completed an Occupational Safety and Health Training Course in

A Guide to Voluntary Compliance

_____ 19 _____

(Instructor)

Figure 2. Official certificate from OSHA Training Institute.

APPENDIX A

JOB SAFETY AND HEALTH INSTRUCTIONAL MATERIALS
MODULE TITLES

JOB SAFETY AND HEALTH INSTRUCTIONAL MATERIALS
MODULE TITLES

SH-01 Materials Handling
SH-02 The Role of OSHA in Safety and Health
SH-03 Fundamentals of Electrical Safety
SH-04 First Response to Medical Emergencies
SH-05 Fire Prevention and Emergency Procedures
SH-06 Walking and Working Surfaces
SH-07 Safety Signs, Tags, and Color Codes
SH-08 Recognizing Job Health Hazards
SH-09 Recognizing Job Safety Hazards
SH-10 Structural Egress and Emergency Procedures
SH-11 Business and Office Safety
SH-12 Personal Protective Equipment
SH-13 Industrial Sanitation and Personal Facilities
SH-14 Using Ropes, Chains and Slings Safely
SH-15 Agribusiness Safety
SH-16 Material Hoist Safety
SH-17 Mechanized Off-Road Equipment Safety
SH-18 Safe Operation of Commercial Vehicles
SH-19 Safety with Hand and Portable Power Tools
SH-20 Precautions for Explosive Materials
SH-21 Marine and Longshoring Safety
SH-22 Ladder and Scaffolding Safety
SH-23 Warehousing Storage and Retrieval Safety
SH-24 Machine and Woodworking Tool Safety
SH-25 Safety Features of Material and Personnel Movement Devices
SH-26 Safety for Compressed Gas and Air Equipment
SH-27 Safety in Elevators and Grain Handling Facilities
SH-28 Welding, Cutting and Brazing Safety
SH-29 Hazardous Materials Safety

SH-30 Safe Handling and Use of Flammable and Combustible Materials
SH-31 Overcurrent and Electrical Shock Protection
SH-32 Working Safely in Confined Spaces
SH-33 Vibration and Noise Control
SH-34 Safety Guards for Machinery
SH-35 Ionizing and Nonionizing Radiation Protection
SH-36 Safety Features for Floor and Wall Openings and Stairways
SH-37 Safety of Concrete, Forms, and Shoring
SH-38 Excavating, Trenching, and Shoring Safety
SH-39 Steel Erection Safety
SH-40 Electrical Power Transmission and Distribution Safety
SH-41 Safety Practices for Demolition Procedures
SH-42 Safe Use of Powered Industrial Trucks
SH-43 Safety Practices for Commercial Diving
SH-44 Exhaust, Dust Collection, and Ventilation Systems
SH-45 Coast Guard Regulations Applied to Offshore Drilling
SH-46 Chemical Hazards and Waste Disposal Safety and Health
SH-47 Safety and Health in Vocational Education
SH-48 OSHA Training Programs
SH-49 Establishing a Company Safety and Health Program
SH-50 Agricultural Chemical and Pesticide Hazards

APPENDIX B

MODULE SH–15
"AGRIBUSINESS SAFETY"

(see CE 031 472)